

Common Features of AAC Devices

Despite the breadth and variety of communication devices on the market, there are 4 features that all devices must share.

1. **A way to represent vocabulary.**
2. **Methods to present choices to the user.**
3. **A way for the user to indicate their choice.**
4. **A means for the listener to interpret the message.**

(R. Haven, 1999).

All AAC devices must include a means of representing vocabulary in a way that the user can understand. Here the device presents the vocabulary to the user through pictures. This type of vocabulary presentation would be effective for someone who is preliterate or who is just learning to associate spoken and written words.

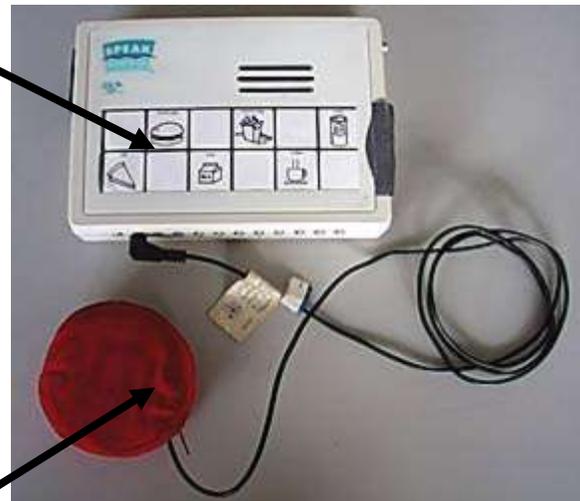
Other options for representing vocabulary items on an AAC device include:

- using partial objects (part of a spray bottle to represent the object)
- using miniature objects
- photographs
- line drawings
- symbols (PCS, Rebus, PicSims)
- Bliss symbols
- Braille
- text (alphabet, words, phrases)

Not all communication devices offer the user the ability to use all of these symbol systems. When choosing your system, be sure to match the user's ability to use symbol representations with the capabilities of the device to display that type of symbol.

AAC devices must include a way for the listener to receive the communication message. Here, the device speaks the message through an internal speaker. All the communication partner needs to do is listen and the message can be transferred.

Most AAC devices that provide voice output will use either **synthesized** or **digitized** speech. These are very different methods of giving feedback to the user. You will learn about each in the following lessons in this unit.



As you learned in the access lesson, direct access is always the preferred method for using an AT device. Unfortunately, some users are not able to directly select items on communication device displays so many devices allow alternative access. This switch in this picture lets the user use either direct input (1 switch for 1 message) or scanning to choose a message by pressing the switch when the item that they want is highlighted. Users with severe physical disabilities may use this type of alternative access method to select from an array of messages.

Direct selection can often be adjusted in higher end AT devices. For example, the team can **alter the amount of physical pressure that is needed to select the choice** (increase or decrease), **select the item by physical contact rather than requiring a press on the switch, point to the item** (e.g., infrared head pointer) and sometimes, **use voice recognition**.

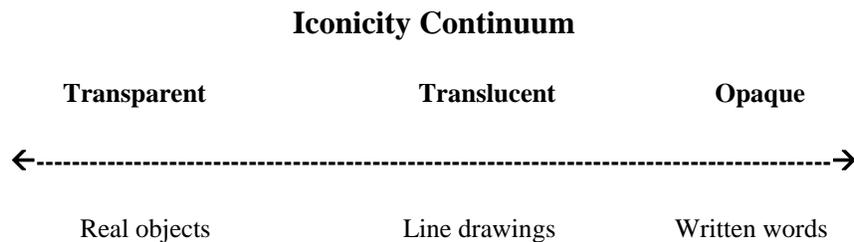
Similarly, when scanning is an option, some devices offer a full range of scanning options (linear, row/column, block). Other devices, however, only offer one of the scanning methods, usually linear.

Matching the user's capabilities with the type of access that the device supports is an important variable in selecting appropriate AAC technology.

A means of representing vocabulary items.

When we are reviewing ways to represent vocabulary, we must examine *symbol systems*. There are a variety of *symbol systems* available for AAC interventions. The decision about which *symbol system* to use is always based on the needs and abilities of the person.

Symbol systems are often represented as a hierarchy. Two factors determine where a specific system falls on this hierarchy. The first factor, **complexity**, refers to the degree to which the symbol is easily understood by others or the amount of training necessary to use the system. Complexity can vary between being **easily understood** (transparent), to **moderately well understood** (translucent), to **difficult to understand** (opaque). This is often shown as a continuum.



The second factor is **flexibility**. *Flexibility* relates to how well the symbol system allows the user to construct and deliver a variety of messages. This is especially important when a user of AAC technology is interacting with other friends in a social system where their vocabulary needs are less predictable.

Symbol Hierarchy.

Real Objects.	<i>Transparent.</i>
Color Photographs.	
Black/white Photographs.	<i>Translucent.</i>
Miniature Objects	
Black/White Line Drawings.	<i>Opaque.</i>
Orthographic Symbols.	

A means of presenting vocabulary items to the user.

The next concern involves the way vocabulary is presented to the user. This involves two different considerations: *displays and organization*. The *display* refers to the way the vocabulary is physically arranged for the user. On low tech devices, the configuration of the display is quite flexible and can be arranged to meet the user's needs. As you progress to more complex moderate and high-tech devices, the display is regulated by the device(s) you choose.

Most moderate and high-tech devices are designed with a grid and will allow you to work within certain parameters to configure that grid. Depending on the specific device, this display may contain between one and 128 keys. Some devices are fixed (that is you do not have the option of changing the display) while others are definable (you can choose to alter the display somewhat). Below are photos of a definable display at different settings.



The next consideration is **organization**. The way vocabulary is organized will significantly effect the way it is used and the amount of time necessary to train the user to select items from the vocabulary set. Low-tech devices are frequently designed around the user's organizational needs. For many moderate tech AAC devices, vocabulary is organized to fit the device display. To handle vocabulary sets that are larger than the amount of items on the hardware display, some moderate-tech and many high-tech devices use one of three methods.

1. **Levels**
2. **Dynamic Display**
3. **Encoding**

Level system: The device stores vocabulary sets (i.e., home, school, dinner), each as a separate "level" in the device. The person must select the level on which the vocabulary item they want is stored, change the display of vocabulary items, and then select the item they intend to use. Devices using level systems:

- [Macaw](#)

- [Black Hawk & SuperHawk](#)
- [Six Level Communicator](#)
- [7 Level Communication Builder](#) (Type in "7 Level Communication Builder" in the Search field)

Dynamic display is an automated level system. The person selects the vocabulary set from the initial screen and the device and recalls the vocabulary set changes and automatically changes the communication display. The user then presses the item they wanted to communicate to their partner. Devices using dynamic display:

- [DynaVox Products](#)
- [Vanguard](#)
- [Freedom 2000](#)
- [Speaking Dynamically](#)
- [Hand Held Voice](#)

Encoding

Some AAC devices allow the user to encode messages. Encoding is a technique where complete sentences or phrases can be stored in memory and retrieved with short strings (usually 2-5 characters) of keystrokes.

1. Salient encoding
2. Letter encoding
3. Alpha-numeric encoding
4. Numeric encoding
5. Ionic encoding

Types of encoding:

Salient letter encoding: the initial letters of salient content words in message are used to construct code. Attempts to establish logical link between the code and message.

Example: "O.D.": Please open the door for me.

How has “encoding” carried over into the general classroom? See how students use encoding

- [Internet Slang Dictionary & Translator](#)
- [Webopedia text messages](#) and the [history](#)
- [NetLingo The Internet Dictionary](#)
- [A Parent Guide to Understanding What Your Child is Typing](#)

Letter category encoding:

Letter category encoding: the initial letter of a code is determined by an organizational scheme that categorizes messages.

- 1st letter of code: G for greeting.
- 2nd letter of code: Specified within category.

Example: "GH": Hello, how are you?

"GN": It's nice to see you today.

Alpha-numeric encoding:

Alpha-numeric encoding: selection of codes that includes both letters and numbers

- Alphabetic part of code: category
- Numeric component: specify individual messages

Example: G1: Hello, how are you?

How do we use this? Codes in our cell phones or voice mail.

Numeric encoding

Numeric encoding: uses numeric codes to represent messages

- The relationship between code and message is completely arbitrary.
- Often, the user needs a display to help remember codes during training

Ionic encoding

Ionic encoding: substitutes multiple meaning pictures for numbers/letters

- Semantic Compaction Systems Semantic Compaction Systems (SCS) is named for a patented language representation technique whose commercial name is often **Minspeak**. [Minspeak™](#) is one of the most common types of ionic encoding. The second most popular system is [Picture Communication Systems](#).

- Another iconic system you should be aware of is [BlissSymbols](#). More at [Blissymbolics Communication International](#)
- [Sequences of icons](#) (picture symbols) are combined to store words, phrases, sentence messages in voice output system. **We use it everyday with our computers! We also tried it out with our boardmarker exercise.**
- Icons are selected for their semantic associations.

Devices using icon coding:

- [Delta Talker](#) *Delta Talker*: Like the Dynavox, initial or more advanced communicators can use the Delta Talker. This device resembles a computer keyboard, but instead of writing words and sentences, different pictures and words are put together to make a sentence. The Delta Talker has picture and word keys in addition to the letters of the alphabet that allow it to produce over 4,000 sounds, words, and phrases. For children that are not able to target a specific area, a switch can be hooked up to the Delta Talker. Even with the assistance of a switch, this device is more complicated than the Dynavox. (as indicated by [New Horizons](#))
- [Vanguard](#)

A way for the user to indicate their choice.

AAC devices offer two options for the user to indicate their choice. Nearly all AAC devices allow the person to use **direct selection** to indicate their choice, given the necessary physical abilities. Direct selection options include touch, single switch input, optical head pointing and, occasionally, eye gaze. Some moderate or high-end devices allow the person with very limited physical abilities to use **scanning**. For a more thorough review of these options, refer back to the *Adaptive Switches* document in the readings.

A way for the listener to interpret the message.

AAC devices typically use **voice output** or **visual output** to assist the listener interpret the message.

1. Voice output speaks when the user has composed their message and wants to transmit the message to the listener.

Two forms of voice output:

- Digitized
- Synthesized

Digitized speech is recorded speech that is stored in the memory chips of the device. It is typically clearer than synthesized speech and allows you to record speech with different dialects or accents, languages that are not written (some American Indian languages), and to add emphasis to a message through natural voice inflections. Because it is so clear, it is used by persons who are learning language or where diction and inflection are important.

Synthesized speech is computer-generated speech. The device stores the basic set of phonemes of the language and pronunciation rules. Each message is built by combining these elements to form an utterance. Synthesized speech is less clear but is much more flexible than digitized speech. It is used by persons who have good vocabularies and in situations where clarity is not at a premium.

2. Visual output presents the message, often in the form of text, in a display window so that the listener can decode the statement. Sometimes, persons who have lost their ability to speak as a result of a stroke prefer text displays because they do not call attention to the person the way speech output does.

Representing Vocabulary Items

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Interpreting the Message.

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Indicating Choice

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